Outline the advantages of cells differentiating to carry out specific functions.

1. All cells in a living organism carry the same genetic information.
   1. Define *stem cell*.
   2. Define the following types of stem cells.

*Pluripotent*

*Multipotent*

*Nullipotent*

* 1. List two types of stem cell that can come from liver stem cells.

1. Outline the process of cell differentiation that leads from an uncommitted stem cell to a specialized cell, including the role of gene expression. A flow chart might help.
2. Outline the relationship between structure and function in three types of specialized cells.

|  |  |
| --- | --- |
| **Specialized cell** | **Structure vs function** |
| *Sperm cell* | *Very small, low energy to produce. Hydrodynamic head with digestive enzymes to aid fertilization of the egg. Rotor section and tail to aid swimming.* |
|  |  |
|  |  |

1. Complete the table below to explain two ways in which stem cells can be used in medicine.

|  |  |  |
| --- | --- | --- |
|  | **Therapeutic cloning** | **Stem cell transplants** |
| **Used to treat** |  |  |
| **Brief method:** |  |  |
| **Ethical considerations** |  |  |